OPI–GGA/5/71/E

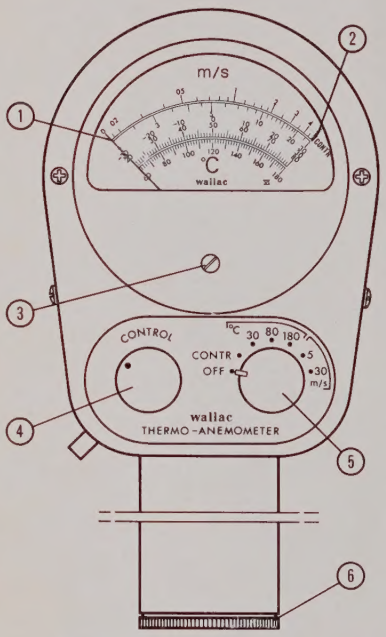
wallac oy

TURKU - FINLAND
CABLE "WALLAC"
TELEX 62-169

THERMO-ANEMOMETER
OPERATING INSTRUCTIONS

OPERATING INSTRUCTIONS

NEVER FORGET TO SWITCH OFF THE CURRENT AFTER USE



1. **Pointer zero point** – check always before use both in horizontal and vertical instrument position.
2. **Battery voltage control mark line.** Before measuring turn the range selector switch knob to control position and adjust the pointer on this mark line with the battery voltage control knob. Recontrol and readjust every 5–10 minutes (every 2–3 minutes when using flashlight cell). If adjustment can not reach the mark line, the battery is spent out and must be replaced for a new, fresh one.
3. **Mechanical pointer zero point adjustment** screw.
4. **Battery voltage control adjustment** knob.
5. **Range selector and on-off switch** knob. After battery voltage control adjustment connect desired detector probe and turn the selector on desired range.
6. **Battery compartment screw lock.**

Place the battery into the handle with right polarity, minus pole against lock contact. If the instrument is stored or left unused for a longer period of time always remove the battery. Leaking cell damages the instrument.

PRINCIPLE OF OPERATION

The hot-wire air velocity probe consists essentially of two fine nickel resistance wires, one heated, one cold. These two resistors form arms of a Wheatstone bridge circuit. Air passing the wires cools the heated wire, lowering its resistance, whilst the unheated wire is unaffected and retains its temperature. A moving coil instrument connected across the bridge indicates the air velocity directly in metres / second. The velocity reading is selfcompensated for changes in ambient temperature. Temperatures are measured by turning the selector switch to the desired temperature range. The heated wire is then disconnected and the unheated wire acts as the temperature-sensitive element in the bridge circuit.

BATTERY

The instrument operates on one **Burgess HG–42 1,4 V mercury cell, or equivalent,** placed inside in the instrument handle and closed by a screw lock at the handle end. The life time of the mercury cell is around 50 operation hours.

If no mercury cells are available the mercury cell can be replaced by a **standard type 1,5 V flashlight drycell** of 33 mm diameter and 60 mm length. A flashlight cell, however, is not to be recommended as the voltage is not stable but sinks during the use, so requiring frequent checking and re-adjustment of the battery voltage. Given accuracies are valid with mercury cell only. The actual life time of a flashlight cell is only abt. 1/5 of that of a mercury cell.

Ni–125 ANE HOT-WIRE PROBE FOR AIR TEMPERATURE AND AIR VELOCITY MEASUREMENTS

Max. temperature +150°C

Available also with a longer telescopic shaft.

The hot-wire elements are very thin and fragile, – never touch the wires inside the shield tube.

Keep the probe clean. Dirt and dust on the element wires cause errors. Dirt can be removed by stirring the probe gently in trichlorethylene or equivalent cleaning liquid.

The hot-wire probe is individually calibrated and matched with its own instrument and must therefore not be exchanged the instruments between. A wrong probe with a wrong instrument may cause considerable measuring errors.

The serial number engraved on the hot-wire probe plastic shaft must be the same as that on the instrument number plate on the back of the instrument. If the instrument or hot-wire probe needs repair, both must be sent together for repair. If you need a new hot-wire probe the instrument must be sent to the factory to be matched and calibrated with the new probe.

The temperature probes, however, are interchangeable with each other and the instruments between.

AIR VELOCITY MEASUREMENTS

Normally operate as instructed on page 2, adjust the battery voltage pointer indication to the red control mark line before measurement.

However, if you want to check the air velocity zero indication or when you are measuring very low velocities at the beginning of the 5 m/s scale, make an additional control adjustment as follows:

Place the hot-wire probe in still air using for example your pocket as wind shield. Turn the range selector switch knob to the 5 m/s range position and adjust the battery voltage adjustment knob until the pointer indicates 0 m/s.

AIR TEMPERATURE MEASUREMENTS

The measuring current through the very thin wires of the air probe temperature detector element causes some self heating, which raises the temperature reading in still air some 1–2 °C. This error is eliminated by an air stream of minimum 0,5 m/s air velocity, **In still air the probe must therefore be swung evenly back and forth in the direction of the shield tube.**

DETECTOR HEADS AM-300, AM-600 AND AM-1200 FOR AIR FLOW RATE MEASUREMENTS m^3/h .

For measurement fix the Thermo-Anemometer air probe Ni-125 ANE into the detector head AM-300, AM-600 or AM-1200 according to fig. 1 and connect the probe to the Thermo-Anemometer GGA 23 S. No calibrations except the battery voltage control are needed and the instrument is now ready for air flow rate measurements.

Measuring ranges:

		metric	ft
AM-300	20 – 300 m^3/h, conversion factor	20	(3,7)
AM-600	50 – 750 m^3/h, conversion factor	50	(9,3)
AM-1200	100–1500 m^3/h, conversion factor	100	(18)

Accuracy:

±5 % for ambient temperature range –10 – +60°C

Max outer dia of ventilation opening:

AM-300 Ø 180 mm
AM-600 Ø 300 mm
AM-1200 624×214 mm

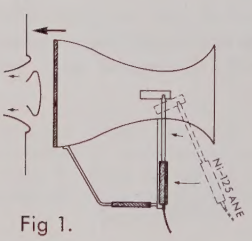


Fig 1.

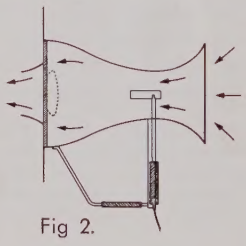
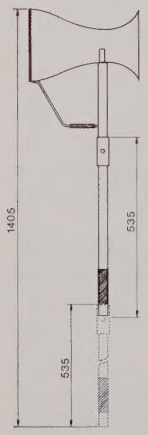
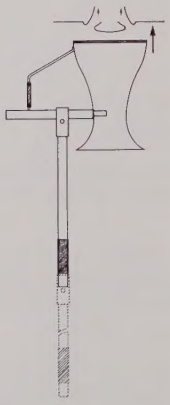


Fig 2.



Straight mounting



Crosswise fastening for ventilation suction openings in ceiling

Fig 3.

For measurement place the detector head tightly over the ventilation opening to be measured and select an air velocity range in the Thermo-Anemometer. The whole ventilation air flows now through the measuring head (fig. 2).

To get air flow rate in m^3/h multiply the m/s reading of the Thermo-Anemometer by factor 20 (3,7) when using the AM-300, by factor 50 (9,3) when using the AM-600 and by factor 100 (18) when using AM-1200 detector head. These factors are valid within air velocity range 1,5 – 30 m/s. Below 1,5 m/s (or 5 FPS) air velocity values the flow rate can be read in the diagram attached to the detector head.

For high located ventilation openings the shaft of the AM-300 and AM-600 measuring heads can be extended by additional 53,5 cm shafts which can easily be attached to the detector head (fig. 3).

SURFACE TEMPERATURE PROBES FOR EVEN AND MODERATELY CURVED SURFACES

Ni–101 X

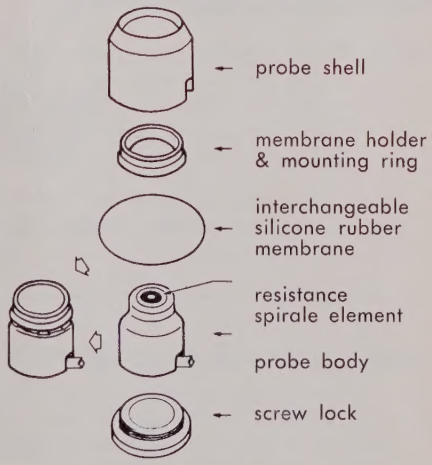
A very sensitive probe with a very thin moulded silicone rubber contact membrane for even and moderately curved surfaces. **Caution** – This is a sensitive probe which does not withstand rough use. Avoid too high pressure, twisting or any force especially against grainy or rough surfaces, which may damage the thin contact layer. We could make the contact layer thicker but the probe would lose its sensitivity, – if we make it harder the contact against grainy or porous surfaces would be poor requiring too long time to take the surface temperature.

Max temperature +180°C, cable +130°C.
½-value time constant 1 sec.

INSTRUCTIONS FOR CONTACT MEMBRANE REPLACEMENT

The membrane must be replaced before it is completely worn out to avoid the damage of resistance element under the membrane.

1. Unscrew the screw lock
2. Remove the probe body from the shell.
3. Detach the membrane holder ring and damaged membrane.
4. Place a new membrane disc on the resistance tip and press down the mounting ring so that the membrane takes its stand evenly and tightly on the resistance element.
5. Push the body into the shell so that the membrane tip properly rises out from the shell and rescrew the screw lock.



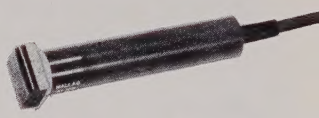
Ni–101 Cu

with a hard copper disc contact tip for absolutely even and metallic surfaces. More rugged and suitable for harder use than Ni 101X. Not suitable for curved, grainy or uneven surfaces.

Max temperature +180°C, cable +130°C.
½-value time constant 2 sec.

INTERCHANGEABLE TEMPERATURE DETECTOR PROBES

SURFACE TEMPERATURE PROBE FOR ROUGH AND CURVED SURFACES



Ni–103

A probe with soft and elastic, self aligning rubber contact element for uneven and rough surfaces. **Caution** – The life of the probe is limited due to internal wear which can not be eliminated in soft probes of this type. Use the probe with care and avoid hard pressing force and turning against surface which will shorten the life-time. Surface dimensions 17×20 mm.

Max. temperature +120°C. ½-value time constant 2 sec.

CAPSULE PROBE FOR BORE-HOLES AND UNIVERSAL USE

Ni–104 G

Capsule type probe with temperature sensitive resistor sealed in a thin wall (0,25 mm) stainless steel tube. Watertightly sealed against the rubber cord with 6 mm outer diameter. Available also with extra long cables (max. 5 metres) and extra long capsule tubing as sleeving. Sheet capsule Ø 6 mm, length 40 mm.

Max. temperature +160°C, cable +130°C.
½-value time constant 3,5 sec.

NEEDLE PROBE FOR SOLID, SEMI-FLUID AND POWDERIZED MATERIALS

Ni–106

Needle type, tip sensitive probe.
Length of sensitive area 13 mm from tip.
Needle Ø 3 mm, length 130 mm.
Available also with a longer stem.

Max. temperature +160°C. ½-value time constant 3 sec.

STEEL BLADE PROBE FOR SLITS, LAYER SURFACES BETWEEN LAMINATES ETC.

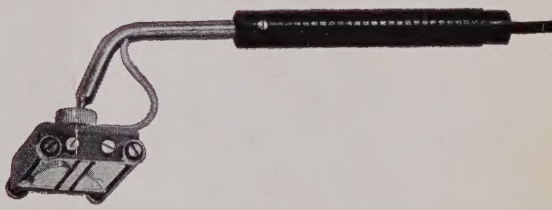
Ni–109 G

Thin, only 0,75 mm thick, very sensitive steel blade probe. Suited for layer temperature measurements between laminates, slits, construction and other materials, between transformer iron core blades etc. Placed between tightly together pressed rectangular milk or frozen meat boxes it gives the internal content temperature without breaking the boxes. Very suitable for general liquid temperature measurements and for general use.

Available also with extra long capsule shaft tubing.
Blade width 9 mm, length 50 mm

Max. temperature +160°C, cable +130°C.
½-value time constant 1 sec.

REVOLVING CYLINDER AND MOVING SURFACE TEMPERATURE PROBE



Ni–11 G

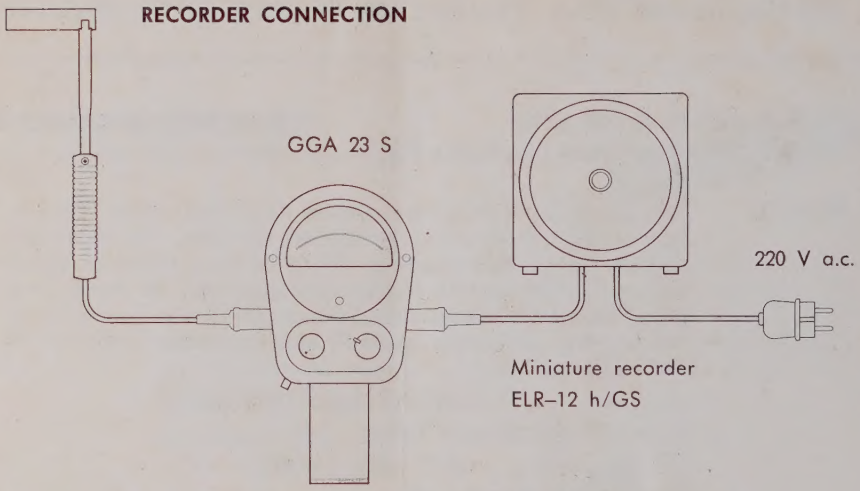
This probe gives the temperature of a moving surface without direct contact with the surface. This eliminates the measuring errors caused by changes in friction and contact pressure.
The temperature sensitive resistor is placed in the focal point of the reflector at a distance of 0,5–1 mm from the surface. It takes the surface temperature partly by radiation and partly by heat conduction. The detector is equipped with an aluminium protecting plate which must be removed before use. **To get right temperature results the position of the ball-bearings must be adjusted so that the distance between the temperature sensitive resistance strip and the surface to be measured is 0,5 – 1 mm.** If the distance is longer the probe will give too low temperature values as a result.

The reflector surface must be kept free of dirt and dust, clean and bright to give accurate results.

Max. temperature +180°C.

Ni–11G/TELE Cylinder surface detector probes similar to Ni–11G equipped with telescopic extension arm up to 3 metres length.

RECORDER CONNECTION



An ELR–12 h/GS miniature recorder can be connected to the thermo-anemometer GGA 23 S for recording of air velocity and temperature values. The connector is on the right side of the meter. Battery life in continuous recorder use is about 48 hours. In recorder use it is necessary to use a mercury cell because normal 1,5 V dry cells cannot support the absolutely stable voltage required in recording.

Miniature dry recorder ELR–12 h/GS is of circular chart type with pressure sensitive paper, diameter 82 mm.

Chart speed selectable 1, 7 or 30 hours / revolution

Chart drive with synchronous motor, 220 or 110 V a.c.

Accuracy ±3 % of full scale deflection

Recorder sensitivity 4,4 mV, 0,5 mA

Recording print impulse interval 6 seconds, stroke intensity adjustable.

Recorder is furnished with separate plastic reading rulers, calibrated for temperature and air velocity ranges.

For chart replacement and speed setting remove the plastic dial cover by turning it anticlockwise and lifting it off.

Connector Hirschmann type Mas 3: pin 1 +, pin 2 and 3 –

Printed in Finland